

Braamwisch Ecological Settlement



location: Hamburg-Bramfeld, Germany
dates: 1996-2000
type: Residential area, 40 housing units (WE) in five town house rows and two duplex houses

use: Residential
size: 1.2 hectares, each terraced house with approx. 125 m2 living quarters and approx. 300 m2 land (hereof approx. 100 m2 community area, e.g. vegetation-based sewage treatment plant, sidewalks)

people: 143

actors: Hamburger Gaswerke, City of Hamburg, citizens

goals: Supplying an entire area with solar heating, climate protection and CO2 reduction, significant reduction of drinking water consumption.

energy use	KWh/m ²
heating&electricity, goal	100
heating&electricity, achieved	90
heating&electricity, best	na
systems	
district heating	X
combined heat & power	
solar panels	X
solar cells	X
biomass and refuse	
wind power	
natural ventilation	X
forced vent.w/heat recovery	X
non-renewable energy	X
individual metering	X*

construction
 Low-energy house, partially solid brick construction, partially wood frame construction

amenities
 Existing amenities (not belonging to settlement): kindergarten, primary school, shops, health care facilities, access to public transport.

special projects
 Resident participation
 Car sharing
 Planted roofs (sheds) and house fronts
 Ecological building material
 Composting toilets
 Rainwater toilets
 Shared use of open space

site ecology
 Rain water collection
 Waste separation
 Plant-based sewage treatment system (grey water)

* Individual metering for heating, electricity, and water in each house. Overheads e.g. for parking lot lighting, sewage plant operations.

process and history

In 1996 the Karlshöhe Solar Settlement was created as a pilot project by Hamburg Gas Works, the company responsible for the city's power supply at that time, with support from the Free and Hanseatic City of Hamburg and the federal government. It was one of the two first major projects in Germany involving solar municipal heating with long-term heat storage in a new residential area. 40 terraced houses in this settlement belong to the Braamwisch Ecological Settlement. It is the product of committed citizens who have realised in practice, through this project, their vision of ecological building and living. Low-energy houses were built, using ecological building materials, equipped with composting toilets and connected to their own plant-based sewage treatment system.





process and history, continued

In the planning of the Braamwisch Ecological Settlement, climate protection and the reduction of carbon dioxide emissions were not the only considerations. The developers also had other aspects of sustainable construction in mind.

- Efficiency (= raising the degree of effectiveness), e.g. by providing houses with good insulation and so reducing power consumption
- Consistency (= connecting with natural cycles), e.g. through an alternative waste water solution involving composting toilets and an on-site plant-based sewage treatment system
- Substitution (= replacement of toxic substances with environmentally friendly substances presenting no hazards to health), e.g. through the use of resource-saving and regenerative raw materials and sources of energy
- Sufficiency (= adequacy), e.g. through the shared use of open spaces and car sharing.

description of special project features

To supply an entire residential area with solar heating – in 1996 this was something that had never been done in Germany before. The Hamburg pilot system was designed to give the idea a first trial. A total of 124 single family terraced houses have been connected to solar collection surfaces measuring 3000 square metres in all. The water that is heated up in the solar collectors is fed into a subterranean hot water tank measuring 4500 cubic metres (see photo below), and should cover about 50 percent of what is needed in the way of heating and domestic hot water. Two low-temperature gas-fuelled condensing boilers at the settlement's central heating unit supply the missing heat energy in winter.

The houses do not have either boilers or chimneys, only a heat transfer station at which the district heating supply arrives, at a temperature of 60°C. It is then transferred to the house's internal heating circulation or to domestic hot water for the bath and kitchen, with the amount of heat that has been tapped being registered. The residents allow the south-pointing surfaces of their roofs to be used for the installation of solar collectors, and pay a one-off connection charge of 6000 euros. This is notably cheaper than the construction of an individual solar collection system, which comes to around 9000 euros minus subsidies.

Since 2002 the low-energy approach to construction has become established standard in Hamburg in connection with new buildings – that is to say, the heat energy needs (without hot water) must not exceed more than 70 kWh per square metre per year. The houses of the Braamwisch Ecological Settlement are still well below this limit: in a mid-terraced house, consumption levels are around 59 kWh per square metre per year, including hot water supply. This amounts to about a third of the consumption level in an average German household (197 kWh per square metre per year). These sparing consumption levels have been achieved in Hamburg's Ecological Settlement by the use of double walls with perlite cavity wall insulation and ecological insulating materials such as isofloc, cork or coconut fibres.

In the steamy rooms (bathroom and kitchen), a ventilator extracts air at all times. Air valves in the wall or in the window frames allow this to be replaced by a flow of fresh incoming air. If the outgoing air is directed by way of a

heat exchanger that can transfer up to 70% of its heat to the cold fresh air. This will result in further energy savings.

In some houses of the Ecological Settlement cob walls have been used.

On two rows of houses a total of 65 square metres of photovoltaic modules were installed to generate electricity. The annual yield is around 5100 kWh, which is fed into the public grid.

In the Braamwisch Ecological Settlement each house is connected to a grey water treatment system, which purifies waste water from the bath and kitchen (not from the toilet). The purified water flows into the closest available stream. The area of the settlement includes three reedbed sewage treatment systems, measuring 250 square metres in all. Each dwelling unit contributed some 8000 euros to the construction of the facility. The sewage systems are common property, the residents are responsible for maintaining them.

A consistent extrapolation of the principle of viewing water as a resource to be handled with care was the installation of composting toilets as opposed to traditional flushing toilets in the houses of the settlement. Various different systems were adopted: 17 houses have a BioLet composting toilet, 9 have a Terra Nova model and 7 a Clivus Multrum. Seven houses in the Braamwisch Ecological Settlement have rainwater toilets.

Braamwisch is not a completely carfree settlement. But all residents agreed that the areas directly adjoining the houses should not be used as a car park but should be made available as a green play area for children. A car-sharing vehicle is available for use on the settlement car park.

funding

For the local solar heating project the overall costs of the Hamburg pilot project came to around 3.4 million euros. Finance was provided by the Federal Ministry of Science, Research and Technology (1.5 million euros), the City of Hamburg (0.5 million euros), Hamburg Gas Works as the operating company (0.7 million euros) and the project developers with around 6000 euros per dwelling unit (0.7 million euros).

results

In comparison with a standard terraced house, the construction costs of a house in the Braamwisch Ecological Settlement will be about 10-15 percent higher. This is balanced out against annual savings of 1200 euros. That corresponds to a payback period of around 20 years – without taking into account rising energy prices and waste water charges. The benefits of healthy construction materials for the resident cannot be directly measured in monetary terms, but they play an important role, too.

The environment, too, is a significant gainer from the construction of ecohouses. An example of a carbon dioxide balance of a house in the settlement (only taking into account power consumption for heating, hot water and electricity) shows that at 0.31 tons of carbon dioxide, an individual in the illustrative household of the Braamwisch Ecological Settlement produces less than one sixth of the amount generated by a person in the average German household (2.05 tons).

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